

## Claims

1. A polypeptide having desaturase activity, which:

a) has the amino acid sequence shown in Figure 1

b) has one or more amino acid deletions, insertions or substitutions relative to a polypeptide as defined in a) above, but has at least 32% amino acid sequence identity therewith; or

c) is a fragment of a polypeptide as defined in a) or b) above, which is at least 100 amino acids long.

2. A polypeptide according to claim 1, which has a cytochrome domain.

3. A polypeptide according to claim 2, which has a cytochrome b<sub>5</sub> domain.

4. A polypeptide according to any preceding claim, which has at least one histidine box.

5. A polypeptide according to any preceding claim, which has three histidine boxes.

6. A polypeptide according to any preceding claim, which is a front end desaturase.

7. A polypeptide according to any preceding claim, which is a  $\Delta^6$  desaturase.

8. A polypeptide according to any preceding claim, which occurs naturally in an organism that does not accumulate GLA.

9. A polypeptide according to any preceding claim, which occurs naturally in a eukaryote.

10. A polypeptide according to any preceding claim, which occurs naturally in an animal.

11. A polypeptide according to any preceding claim, which occurs naturally in a nematode.

12. A polypeptide according to any preceding claim, which occurs naturally in *C. elegans*.

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Sub A1

Sub 2

13. A polypeptide according to claim 1, which consists of the amino acid sequence shown in Figure 1 or of a part thereof.

Sub A2

14. A polypeptide comprising a polypeptide according to any preceding claim, when covalently linked to another moiety.

15. The use of a polypeptide according to any of claims 1 to 14 in raising or selecting antibodies.

16. The use of a polypeptide according to any of claims 1 to 14 as a marker for transformation.

17. The use of a polypeptide according to claim 16 as a marker for plant transformation.

Sub A3

18. An antibody or a derivative thereof which binds to a polypeptide according to any of claims 1 to 14.

19. An antibody or a derivative thereof according to claim 18, for use in diagnosis.

Sub A4

20. A method for assessing whether or not an organism has a polypeptide according to any of claims 1 to 14, comprising determining whether or not the organism has a polypeptide that binds to an antibody or a derivative thereof according to claim 18.

21. A method according to claim 20 in which the organism is a human.

22. A method according to claim 20 or 21 preferred *in vitro*.

23. A polypeptide according to any of claims 1 to 14, for use in medicine.

Sub A5

24. The use of a polypeptide according to any of claims 1 to 14 in the preparation of a medicament for treating a disorder involving a deficiency in GLA in a metabolite derived *in vivo* from GLA.

25. The use of a polypeptide according to claim 23 in which the metabolite is an eicosanoid.

- Sub A6
26. The use according to claim 23, 24, or 25 wherein the disorder is eczema, mastalgia, hypercholesterolemia, atherosclerosis, coronary disease, diabetic neuropathy, viral infections, acne, cirrhosis, hypertension and cancer.
27. A method of making GLA comprising using a polypeptide according to any one of claims 1 to 14 to convert linoleic acid to GLA
28. A method of making OTA comprising using a polypeptide according to any one of claims 1 to 14 to convert  $\alpha$  linoleic acid to OTA.
29. A nucleic acid molecule which:
- a) codes for a polypeptide according to any of claims claim 1 to 14,
  - b) is the complement of a nucleic acid molecule as defined in a) above, or
  - c) hybridises to a nucleic acid molecule as defined in a) or b) above.
30. A vector comprising a nucleic acid molecule according to claim 29.
31. A host comprising a nucleic acid molecule according to claim 27 or a vector according to claim 30.
32. A host according to claim 31, which is a plant or plant propagating material.
- Sub A7
33. A host according to claim 31 or claim 32, which is oil seed rape, sunflower, cereals including maize, tobacco, legumes including peanut and soybean, safflower, oil palm, coconut and other palms, cotton, sesame, mustard, linseed, castor, borage and evening primrose; or which is propagating material for any of the aforesaid.
34. A method for obtaining a polypeptide according to any of claims 1 to 14, comprising incubating a host according to any of claims 31 to 33 under conditions causing expression of said polypeptide and then purifying said polypeptide.
35. The use of nucleic acid molecule according to claim 29 as a probe or as a primer.

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36. The use of a nucleic acid molecule according to claim 29 or a vector according to claim 30 for preparing an organism that accumulates GLA or a metabolite derived from GLA in that organism.

37. The use of a nucleic acid molecule according to claim 29 or a vector according to claim 30 for preparing an that is chill resistant .

38. A method of producing a host according to any of claims 31 to 33, comprising incorporating a nucleic acid according to claim 29 or a vector according to claim 30 into an organism.

Sub A 8

add c3

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